



RAW SEQUENCE LISTING
PATENT APPLICATION: US/09/770,875

DATE: 08/08/2002
TIME: 09:44:23

Input Set : A:\Nih42531.app
Output Set: N:\CRF3\08082002\I770875.raw

3 <110> APPLICANT: CIEPLAK, WITOLD
5 <120> TITLE OF INVENTION: PERTUSSIN TOXIN GENE: CLONING AND EXPRESSION OF
6 PROTECTIVE ANTIGEN
8 <130> FILE REFERENCE: 2026-4253US7
10 <140> CURRENT APPLICATION NUMBER: 09/770,875
11 <141> CURRENT FILING DATE: 2001-01-26
13 <150> PRIOR APPLICATION NUMBER: 07/311,612
14 <151> PRIOR FILING DATE: 1989-02-15
16 <150> PRIOR APPLICATION NUMBER: 07/542,149
17 <151> PRIOR FILING DATE: 1990-06-22
19 <150> PRIOR APPLICATION NUMBER: 08/483,326
20 <151> PRIOR FILING DATE: 1995-06-07
22 <150> PRIOR APPLICATION NUMBER: 09/128,911
23 <151> PRIOR FILING DATE: 1998-08-04
25 <160> NUMBER OF SEQ ID NOS: 28
27 <170> SOFTWARE: PatentIn Ver. 2.1
29 <210> SEQ ID NO: 1
30 <211> LENGTH: 184
31 <212> TYPE: DNA
32 <213> ORGANISM: Bordetella pertussis
34 <400> SEQUENCE: 1
35 cccgggacag ggcggcgccc ggcggtcgcg ggtccgcgcc ctggcggtggt tccctgccatc 60
36 cggcgcgatg acgcattctt ccccgccct ggcgcagctt ccttatgtgc tggatgaagac 120
37 caatatggtg gtcaccagcg tagccatgaa gccgatgaa gtcaccccca cgcggtatgct 180
38 ggtc 184
41 <210> SEQ ID NO: 2
42 <211> LENGTH: 61
43 <212> TYPE: PRT
44 <213> ORGANISM: Bordetella pertussis
46 <400> SEQUENCE: 2
47 Pro Gly Gln Gly Gly Ala Arg Arg Ser Arg Val Arg Ala Leu Ala Trp
48 1 5 10 15
50 Leu Leu Ala Ser Gly Ala Met Thr His Leu Ser Pro Ala Leu Ala Asp
51 20 25 30
53 Val Pro Tyr Val Leu Val Lys Thr Asn Met Val Val Thr Ser Val Ala
54 35 40 45
56 Met Lys Pro Tyr Glu Val Thr Pro Thr Arg Met Leu Val
57 50 55 60
60 <210> SEQ ID NO: 3
61 <211> LENGTH: 17
62 <212> TYPE: DNA
63 <213> ORGANISM: Bordetella pertussis
65 <220> FEATURE:

RAW SEQUENCE LISTING

PATENT APPLICATION: US/09/770,875

DATE: 08/08/2002

TIME: 09:44:23

Input Set : A:\Nih42531.app

Output Set: N:\CRF3\08082002\I770875.raw

```

66 <223> OTHER INFORMATION: Purine (P) R=G or A; Y=T or C; N=A, C, G, or T
68 <220> FEATURE:
69 <221> NAME/KEY: modified_base
70 <222> LOCATION: (6)
72 <220> FEATURE:
73 <221> NAME/KEY: modified_base
74 <222> LOCATION: (9)
76 <220> FEATURE:
77 <221> NAME/KEY: modified_base
78 <222> LOCATION: (12)
80 <220> FEATURE:
81 <221> NAME/KEY: modified_base
82 <222> LOCATION: (15)
84 <400> SEQUENCE: 3
W--> 85 atgaarccnt aygargt 17
88 <210> SEQ ID NO: 4
89 <211> LENGTH: 30
90 <212> TYPE: PRT
91 <213> ORGANISM: Bordetella pertussis
93 <220> FEATURE:
94 <223> OTHER INFORMATION: Xaa = Any amino acid; the 8th Val and 4th Pro are
95     questionable.
97 <220> FEATURE:
98 <221> NAME/KEY: VARIANT
99 <222> LOCATION: (15)
101 <400> SEQUENCE: 4
W--> 102 Asp Val Pro Tyr Val Leu Val Lys Thr Asn Met Val Val Thr Xaa Val
103     1           5           10           15
105 Ala Met Lys Pro Tyr Glu Val Val Pro Pro Arg Met Leu Val
106     20           25           30
109 <210> SEQ ID NO: 5
110 <211> LENGTH: 4210
111 <212> TYPE: DNA
112 <213> ORGANISM: Bordetella pertussis
114 <220> FEATURE:
115 <221> NAME/KEY: CDS
116 <222> LOCATION: (507)..(1313)
118 <220> FEATURE:
119 <221> NAME/KEY: CDS
120 <222> LOCATION: (1356)..(2033)
122 <220> FEATURE:
123 <221> NAME/KEY: CDS
124 <222> LOCATION: (2093)..(2485)
126 <220> FEATURE:
127 <221> NAME/KEY: CDS
128 <222> LOCATION: (2500)..(2859)
130 <220> FEATURE:
131 <221> NAME/KEY: CDS
132 <222> LOCATION: (2945)..(3625)

```

RAW SEQUENCE LISTING

PATENT APPLICATION: US/09/770,875

DATE: 08/08/2002

TIME: 09:44:23

Input Set : A:\Nih42531.app

Output Set: N:\CRF3\08082002\I770875.raw

134 <400> SEQUENCE: 5

```

135 gaattcgctcg cctcgccctg gtctgcgctc atggcccccagggaaccga cccaagata 60
137 atcgctcctgc tcaaccgccca catcaacgag gcgctgcagt ccaaggcggt cgtcgaggcc 120
139 ttgcccgcgc aaggcgccac gccggtcatc gccacgcgg atcagaccgc cggcttcac 180
141 gcagacgaga tccagcgtg ggcggcgctc gtgcgcgaaa ccggcgccaa gctgaagtag 240
143 cagcgcagcc ctccaacgcg ccatccccgt ccggccggca ccatcccgca tacgtgttg 300
145 caaccgccaa cgcgcgtgcg tgcagattcg tcgtacaaaa cctcgattc ttccgtacat 360
147 cccgctactg caatccaaca cggcatgaac gtccttcgg cgcaaagtgc cgcgatggta 420
149 ccggtcaccg tccggaccgt gctgaccccc ctgccatggt gtgatcccta aaataggcac 480
151 catcaaaacg cagaggggaa gacggg atg cgt tgc act cgg gca att cgc caa 533
152                                     Met Arg Cys Thr Arg Ala Ile Arg Gln
153                                     1                               5
155 acc gca aga aca ggc tgg ctg acg tgg ctg gcg att ctt gcc gtc acg 581
156 Thr Ala Arg Thr Gly Trp Leu Thr Trp Leu Ala Ile Leu Ala Val Thr
157 10                               15                               20                               25
159 gcg ccc gtg act tcg ccg gca tgg gcc gac gat cct ccc gcc acc gta 629
160 Ala Pro Val Thr Ser Pro Ala Trp Ala Asp Asp Pro Pro Ala Thr Val
161                               30                               35                               40
163 tac cgc tat gac tcc cgc ccg ccg gag gac gtt ttc cag aac gga ttc 677
164 Tyr Arg Tyr Asp Ser Arg Pro Pro Glu Asp Val Phe Gln Asn Gly Phe
165                               45                               50                               55
167 acg gcg tgg gga aac aac gac aat gtg ctc gac cat ctg acc gga cgt 725
168 Thr Ala Trp Gly Asn Asn Asp Asn Val Leu Asp His Leu Thr Gly Arg
169                               60                               65                               70
171 tcc tgc cag gtc ggc agc agc aac agc gct ttc gtc tcc acc agc agc 773
172 Ser Cys Gln Val Gly Ser Ser Asn Ser Ala Phe Val Ser Thr Ser Ser
173                               75                               80                               85
175 agc cgg cgc tat acc gag gtc tat ctc gaa cat cgc atg cag gaa gcg 821
176 Ser Arg Arg Tyr Thr Glu Val Tyr Leu Glu His Arg Met Gln Glu Ala
177 90                               95                               100                               105
179 gtc gag gcc gaa cgc gcc ggc agg ggc acc ggc cac ttc atc ggc tac 869
180 Val Glu Ala Glu Arg Ala Gly Arg Gly Thr Gly His Phe Ile Gly Tyr
181                               110                               115                               120
183 atc tac gaa gtc cgc gcc gac aac aat ttc tac ggc gcc gcc agc tcg 917
184 Ile Tyr Glu Val Arg Ala Asp Asn Asn Phe Tyr Gly Ala Ala Ser Ser
185                               125                               130                               135
187 tac ttc gaa tac gtc gac act tat ggc gac aat gcc ggc cgt atc ctc 965
188 Tyr Phe Glu Tyr Val Asp Thr Tyr Gly Asp Asn Ala Gly Arg Ile Leu
189                               140                               145                               150
191 gcc ggc gcg ctg gcc acc tac cag agc gaa tat ctg gca cac cgg cgc 1013
192 Ala Gly Ala Leu Ala Thr Tyr Gln Ser Glu Tyr Leu Ala His Arg Arg
193                               155                               160                               165
195 att ccg ccc gaa aac atc cgc agg gta acg ccg gtc tat cac aac ggc 1061
196 Ile Pro Pro Glu Asn Ile Arg Arg Val Thr Arg Val Tyr His Asn Gly
197 170                               175                               180                               185
199 atc acc ggc gag acc acg acc acg gag tat tcc aac gct cgc tac gtc 1109
200 Ile Thr Gly Glu Thr Thr Thr Thr Glu Tyr Ser Asn Ala Arg Tyr Val
201                               190                               195                               200
203 agc cag cat act cgc gcc aat ccc aac ccc tac aca tcg cga agg tcc 1157

```

RAW SEQUENCE LISTING

DATE: 08/08/2002

PATENT APPLICATION: US/09/770,875

TIME: 09:44:23

Input Set : A:\Nih42531.app

Output Set: N:\CRF3\08082002\I770875.raw

204	Ser	Gln	His	Thr	Arg	Ala	Asn	Pro	Asn	Pro	Tyr	Thr	Ser	Arg	Arg	Ser	
205				205					210					215			
207	gta	gcg	tcg	atc	gtc	ggc	aca	ttg	gtg	cgc	atg	gcg	ccg	gtg	ata	ggc	1205
208	Val	Ala	Ser	Ile	Val	Gly	Thr	Leu	Val	Arg	Met	Ala	Pro	Val	Ile	Gly	
209			220					225					230				
211	gct	tgc	atg	gcg	cgg	cag	gcc	gaa	agc	tcc	gag	gcc	atg	gca	gcc	tgg	1253
212	Ala	Cys	Met	Ala	Arg	Gln	Ala	Glu	Ser	Ser	Glu	Ala	Met	Ala	Ala	Trp	
213		235					240					245					
215	tcc	gaa	cgc	gcc	ggc	gag	gcg	atg	gtt	ctc	gtg	tac	tac	gaa	agc	atc	1301
216	Ser	Glu	Arg	Ala	Gly	Glu	Ala	Met	Val	Leu	Val	Tyr	Tyr	Glu	Ser	Ile	
217	250				255				260						265		
219	gcg	tat	tcg	ttc	tagacctggc	ccagccccgc	ccaactccgg	taattcaaca	gc								1355
220	Ala	Tyr	Ser	Phe													
222	atg	ccg	atc	gac	cgc	aag	acg	ctc	tgc	cat	ctc	ctg	tcc	gtt	ctg	ccg	1403
223	Met	Pro	Ile	Asp	Arg	Lys	Thr	Leu	Cys	His	Leu	Leu	Ser	Val	Leu	Pro	
224	270				275				280						285		
226	ttg	gcc	ctc	ctc	gga	tct	cac	gtg	gcg	cgg	gcc	tcc	acg	cca	ggc	atc	1451
227	Leu	Ala	Leu	Leu	Gly	Ser	His	Val	Ala	Arg	Ala	Ser	Thr	Pro	Gly	Ile	
228				290				295						300			
230	gtc	att	ccg	ccg	cag	gaa	cag	att	acc	cag	cat	ggc	agc	ccc	tat	gga	1499
231	Val	Ile	Pro	Pro	Gln	Glu	Gln	Ile	Thr	Gln	His	Gly	Ser	Pro	Tyr	Gly	
232			305					310					315				
234	cgc	tgc	gcg	aac	aag	acc	cgt	gcc	ctg	acc	gtg	gcg	gaa	ttg	cgc	ggc	1547
235	Arg	Cys	Ala	Asn	Lys	Thr	Arg	Ala	Leu	Thr	Val	Ala	Glu	Leu	Arg	Gly	
236			320				325					330					
238	agc	ggc	gat	ctg	cag	gag	tac	ctg	cgt	cat	gtg	acg	cgc	ggc	tgg	tca	1595
239	Ser	Gly	Asp	Leu	Gln	Glu	Tyr	Leu	Arg	His	Val	Thr	Arg	Gly	Trp	Ser	
240		335			340				345								
242	ata	ttt	gcg	ctc	tac	gat	ggc	acc	tat	ctc	ggc	ggc	gaa	tat	ggc	ggc	1643
243	Ile	Phe	Ala	Leu	Tyr	Asp	Gly	Thr	Tyr	Leu	Gly	Gly	Glu	Tyr	Gly	Gly	
244	350				355				360						365		
246	gtg	atc	aag	gac	gga	aca	ccc	ggc	ggc	gca	ttc	gac	ctg	aaa	acg	acg	1691
247	Val	Ile	Lys	Asp	Gly	Thr	Pro	Gly	Gly	Ala	Phe	Asp	Leu	Lys	Thr	Thr	
248				370				375					380				
250	ttc	tgc	atc	atg	acc	acg	cgc	aat	acg	ggt	caa	ccc	gca	acg	gat	cac	1739
251	Phe	Cys	Ile	Met	Thr	Thr	Arg	Asn	Thr	Gly	Gln	Pro	Ala	Thr	Asp	His	
252			385					390					395				
254	tac	tac	agc	aac	gtc	acc	gcc	act	cgc	ctg	ctc	tcc	agc	acc	aac	agc	1787
255	Tyr	Tyr	Ser	Asn	Val	Thr	Ala	Thr	Arg	Leu	Leu	Ser	Ser	Thr	Asn	Ser	
256		400					405					410					
258	agg	cta	tgc	gcg	gtc	ttc	gtc	aga	agc	ggg	caa	ccg	gtc	att	ggc	gcc	1835
259	Arg	Leu	Cys	Ala	Val	Phe	Val	Arg	Ser	Gly	Gln	Pro	Val	Ile	Gly	Ala	
260		415					420					425					
262	tgc	acc	agc	ccg	tat	gac	ggc	aag	tac	tgg	agc	atg	tac	agc	cgg	ctg	1883
263	Cys	Thr	Ser	Pro	Tyr	Asp	Gly	Lys	Tyr	Trp	Ser	Met	Tyr	Ser	Arg	Leu	
264	430				435				440				445				
266	cgg	aaa	atg	ott	tac	ctg	atc	tac	gtg	gcc	ggc	atc	tcc	gta	cgc	gtc	1931
267	Arg	Lys	Met	Leu	Tyr	Leu	Ile	Tyr	Val	Ala	Gly	Ile	Ser	Val	Arg	Val	
268				450				455					460				

RAW SEQUENCE LISTING

PATENT APPLICATION: US/09/770,875

DATE: 08/08/2002

TIME: 09:44:23

Input Set : A:\Nih42531.app

Output Set: N:\CRF3\08082002\I770875.raw

```

270 cat gtc agc aag gaa gaa cag tat tac gac tat gag gac gca acg ttc 1979
271 His Val Ser Lys Glu Glu Gln Tyr Tyr Asp Tyr Glu Asp Ala Thr Phe
272          465          470          475
274 gag act tac gcc ctt acc ggc atc tcc atc tgc aat cct gga tca tcc 2027
275 Glu Thr Tyr Ala Leu Thr Gly Ile Ser Ile Cys Asn Pro Gly Ser Ser
276          480          485          490
278 tta tgc tgagacgctt cccactcga accaccgccc cgggacaggg cggcgcccgg 2083
279 Leu Cys
280          495
282 cggtcgcgc atg cgc gcc ctg gcg tgg ttg ctg gca tcc ggc gcg atg acg 2134
283          Met Arg Ala Leu Ala Trp Leu Leu Ala Ser Gly Ala Met Thr
284          500          505
286 cat ctt tcc ccc gcc ctg gcc gac gtt cct tat gtg ctg gtg aag acc 2182
287 His Leu Ser Pro Ala Leu Ala Asp Val Pro Tyr Val Leu Val Lys Thr
288 510          515          520          525
290 aat atg gtg gtc acc agc gta gcc atg aag ccg tat gaa gtc acc ccg 2230
291 Asn Met Val Val Thr Ser Val Ala Met Lys Pro Tyr Glu Val Thr Pro
292          530          535          540
294 acg cgc atg ctg gtc tgc ggc atc gcc gcc aaa ctg ggc gcc gcg gcc 2278
295 Thr Arg Met Leu Val Cys Gly Ile Ala Ala Lys Leu Gly Ala Ala Ala
296          545          550          555
298 agc agc ccg gac gcg cac gtg ccg ttc tgc ttc ggc aag gat ctc aag 2326
299 Ser Ser Pro Asp Ala His Val Pro Phe Cys Phe Gly Lys Asp Leu Lys
300          560          565          570
302 cgt ccc ggc agc agt ccc atg gaa gtc atg ttg cgc gcc gtc ttc atg 2374
303 Arg Pro Gly Ser Ser Pro Met Glu Val Met Leu Arg Ala Val Phe Met
304          575          580          585
306 caa caa cgg ccg ctg cgc atg ttt ctg ggt ccc aag caa ctc act ttc 2422
307 Gln Gln Arg Pro Leu Arg Met Phe Leu Gly Pro Lys Gln Leu Thr Phe
308 590          595          600          605
310 gaa ggc aag ccc gcg ctc gaa ctg atc cgg atg gtc gaa tgc agc ggc 2470
311 Glu Gly Lys Pro Ala Leu Glu Leu Ile Arg Met Val Glu Cys Ser Gly
312          610          615          620
314 aag cag gat tgc ccc tgaaggcgaa cccc atg cat acc atc gca tcc atc 2520
315 Lys Gln Asp Cys Pro          Met His Thr Ile Ala Ser Ile
316          625          630
318 ctg ttg tcc gtg ctc ggc ata tac agc ccg gct gac gtc gcc ggc ttg 2568
319 Leu Leu Ser Val Leu Gly Ile Tyr Ser Pro Ala Asp Val Ala Gly Leu
320          635          640          645
322 ccg acc cat ctg tac aag aac ttc act gtc cag gag ctg gcc ttg aaa 2616
323 Pro Thr His Leu Tyr Lys Asn Phe Thr Val Gln Glu Leu Ala Leu Lys
324 650          655          660          665
326 ctg aag ggc aag aat cag gag ttc tgc ctg acc gcc ttc atg tcg ggc 2664
327 Leu Lys Gly Lys Asn Gln Glu Phe Cys Leu Thr Ala Phe Met Ser Gly
328          670          675          680
330 aga agc ctg gtc cgg gcg tgc ctg tcc gac gcg gga cac gag cac gac 2712
331 Arg Ser Leu Val Arg Ala Cys Leu Ser Asp Ala Gly His Glu His Asp
332          685          690          695
334 acg tgg ttc gac acc atg ctt ggc ttt gcc ata tcc gcg tat gcg ctc 2760

```

RAW SEQUENCE LISTING ERROR SUMMARY
PATENT APPLICATION: US/09/770,875

DATE: 08/08/2002
TIME: 09:44:24

Input Set : A:\Nih42531.app
Output Set: N:\CRF3\08082002\I770875.raw

Please Note:

Use of n and/or Xaa have been detected in the Sequence Listing. Please review the Sequence Listing to ensure that a corresponding explanation is presented in the <220> to <223> fields of each sequence which presents at least one n or Xaa.

Seq#:3; N Pos. 9
Seq#:4; Xaa Pos. 15

VERIFICATION SUMMARY

PATENT APPLICATION: US/09/770,875

DATE: 08/08/2002

TIME: 09:44:24

Input Set : A:\Nih42531.app

Output Set: N:\CRF3\08082002\I770875.raw

L:85 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:3 after pos.:0

L:102 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:4 after pos.:0